## REMARKS

Claim 2 is pending. The Examiner has objected to Claim 2 because of informalities. The Examiner has rejected Claim 2 under 35 USC §112 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner further rejects Claim 2 under 35 USC §102(b) as being anticipated by Kojima and Nagano.

The applicant has amended Claim 2. The foregoing amendments and following remarks are considered by applicant to overcome each of the Examiner's outstanding rejections. An early Notice of Allowance is therefore requested.

The Examiner objected to Claim 2 because of certain informalities. Each of the informalities that were identified by the Examiner were corrected by appropriate amendment. Thus, the Examiner's objections are traversed.

The Examiner rejected Claim 2 under 35 U.S.C. §112 because there was no antecedent basis for the claim language "the maximum position." Claim 2 has been amended to correct the lack of antecedent basis. Consequently, the Examiner's rejection of Claim 2 on that basis is traversed.

The Examiner further rejects Claim 2 under 35 USC §102(b) as being anticipated by Kojima and Nagano (English abstract of JP 04-093908, reference AR in applicants' IDS). A copy of a translation of that complete reference, as done by the automatic translation service provided by the Japanese Patent Office, is attached hereto as Exhibit A. The purpose of the Kojima invention is not to detect the number of positions in a microscope nosepiece or slider, it is to store the different focal positions for each objective. Thus, the positions that are stored are not the positions of the objectives on the revolver, but the stage positions corresponding to the different focal lenghts. Thus, the Examiner's contention that Kojima teaches "comparing this maximum position to a position registered in a memory" (emphasis added) is incorrect since Kojima is referring to stage positions and the invention involves revolver positions. Consequently, the Examiner's rejection of Claim 2 based on Kojima is traversed.

Claim 2 has been amended to include the limitation that the adjusting step is performed by rotating the nosepiece back one position. This amendment is not done in response to any rejection by the Examiner nor due to any statutory requirements of patentability.

Claims 2, the only claim pending in the application, is believed by applicants to define patentable subject matter and should be passed to issue at the earliest possible time. An early Notice of Allowance is requested. Please call the undersigned for any reason to expedite prosecution of this application.

Respectfully submitted,

GHK/SMC:dw

Stephen M. Chin, Reg. No. 39,938
Reed Smith LLP, 29th Floor
599 Lexington Avenue
New York, NY 10022-7650

Enclosure

## DETAILED DESCRIPTION

[Detailed Description of the Invention]
[Industrial Application]
this invention relates to two or more objective lenses which can be switched, and the microscope equipped with the focus detection means.
[Description of the Prior Art]
The microscope which can carry out expansion observation of the detailed sample now, or can record an observation image as a photograph, a video picture, etc. is a start student about an industrial field. This kind of microscope attaches in the revolver of a rotating type two or more objective lenses with which magnifying power usually differs, and when changing an observation scale factor, it is performing the above-mentioned revolver electric or by switching the objective lens which rotates manually and should be inserted into observation optical system. By the way, under the microscope of this kind former, since focus gap of some arises according to change operation of an objective lens according to the part precision error of a revolver or an objective lens, you have to perform focus doubling operation again. Then, the applicant for this patent proposed the microscope under which the focus position was automatically amended by making an amendment amendment means provide in the image formation state at the time of the change of an objective lens in Japanese Patent Application No. No. 65399 [ two to ] based on these ** data of the storage means which memorized these ** data for every objective lens, and the objective lens currently used before the change and the objective lens used after a change.
According to this, in order to change an observation scale factor, even if it switches the objective lens attached in the revolver, an always good focus state is acquired and it is not necessary to carry out focus doubling after an objective lens change.
[Problem(s) to be Solved by the Invention]
However, operation was troublesome in order to have to perform a setup of the amount of amendments of an amendment sake for gap (this ** gap) of the focus position accompanying a change manually under the microscope by the above-mentioned proposal using a keyboard etc. Moreover, the objective lens and frame of a microscope had the trouble that an effect was not acquired, if the above-mentioned amount of amendments does not change somewhat during prolonged use, either and did not set [ therefore ] up the amount of amendments especially each time, since a size etc. changed with change of ambient temperature etc.
even if especially the place that this invention is made in view of such a trouble that a Prior art has, and is made into the purpose does not need to perform the amount of amendments of this ** gap with manual operation and uses it for a long time, this ** gap by the change which is an objective lens tends to offer the good microscope of operability which may be amended accurately
[The means for solving a technical problem]
In order to attain the above-mentioned purpose, the microscope by this invention An amendment means to amend this ** gap with a storage means to memorize these ** data for every each set object lens, and the objective lens currently used before the change and the objective lens used after a change based on the data of the above-mentioned storage means, and to make a good image formation state hold, It has a means to always update these ** data of each set object lens memorized by the above-mentioned storage means at the time of focus detection.
[For ** ]

The storage means has memorized the difference with the focus position by the objective lens switched that it should be used for the focus position and the degree by the objective lens in use in the form of a data table, and when an objective lens is switched, a stage has it to the focus position which suited the objective lens switched automatically, and it is caused by the amendment means in it from the difference of the above-mentioned focus position between the objective lenses before a change. The focus position data of each set object lens memorized by the storage means are updated at the time of focus detection.

[Example]

Hereafter, based on the illustrated example, this invention is explained in detail. The rotating type revolver [ main part / of a microscope ] which attached two or more objective lenses with which 1 differs and 2 differs in a scale factor in the view 1, The image detection sensor for 3 detecting the image formed with the objective lens inserted into the observation optical path, The image detector which changes into an electrical signal the image by which 4 was detected by the image detection sensor 3, The revolver position detection sensor which detects which objective lens, as for 5, is inserted in the observation optical path now, The revolver drive circuit which drives a revolver 2 electrically in order that 6 may switch an objective lens, The stage position detection sensor which consisted of scales, such as a rotary encoder for the sample move stage where 7 can move in the direction of an optical axis of an objective lens, and 8 detecting the current position of a stage 7 The stage drive circuit for 9 driving a stage 7, the control circuit to which 10 manages operation of the image detector 4, the revolver position detection sensor 5, the revolver drive circuit 6, the stage position detection sensor 8, and the stage drive circuit 9, The store circuit which memorizes the data needed on the occasion of arithmetic circuit control [ 11 ] according / 12 / to a control circuit 10, 13 is the control section including the switch 17 for carrying out the RLC of the switch 16 and revolver 2 for carrying out the RRC of the AF switch 15 and revolver 2 for performing the initial-setting switch 14 and focus detection for setting up an initial data. In addition, the data table 18 ( view 2) memorized after the storage which memorizes temporarily many data needed in control process is contained in the control circuit 10 and an electric power switch is turned off by the store circuit 12 is contained. In the rotating type revolver 2, as shown for example, in the 3rd view Although each set object lenses 19, 20, and 21 and .... are had and caused to the moving part into an observation optical path from a criteria position, respectively The reflecting plates 210, 211, and 212 of a concentric circle arc prolonged [ the range corresponding to a required angle of rotation ], .... or slit 210' of a concentric circle arc, 211', 212', and .. are prepared. Two or more above-mentioned reflecting plates 210, 211, and 212 and .. which were arranged so that it might correspond to these, respectively, when two or more reflected type photosensors 501, 502, and 503 and .... were used as a revolver position detection sensor 5 are used. Moreover, two or more above-mentioned slit 210' arranged so that it might correspond to these, respectively, when two or more penetrated type photosensor 501', 502', 503', and .... were used as revolver position detection sensor 5', 211', 212', and .. are used. It can detect now whether which objective lens was inserted by it into the observation optical path.

Next, it explains, referring to the flow chart of a view 4 about an operation of the above-mentioned example.

Usually, although 4-6 objective lenses are attached in the microscope, the focus position of each set object lens changes mutually with projection differences of each set object lens anchoring part of the difference in the own focal distance of each set

object lens, or a revolver. A view 5 shows objective lenses 19, 20, and 21, ...., stage position 19' at the time of the focus of N, 20', 21', .., N' in graph. Therefore, it is necessary to make the data table 18 in a store circuit 12 memorize the focus stage position for every objective lens, and to place it in a certain form, as data peculiar to each set object lens. According to this example, it is made to memorize this data as follows.

Point ** and initial setting are described. If the objective lens 19 is now inserted on the observation optical path and the initial-setting switch 14 of the control section 13 is pushed, in order that a control circuit 10 may perform focus detection of an objective lens 19, the picture signal from the image detection sensor 3 will be incorporated through the image detector 4, for example, the sample move stage 7 will be moved by the stage drive circuit 9 using the focus method of detection of the common knowledge like the contrast method, and a focus state will be acquired. Stage position 19' ( view 5) and the use objective lens 19 (namely, revolver position) which were obtained in this way are made to memorize temporarily to the memory in a control circuit 10. A stage position is memorized into A portion of the memory in a control circuit 10, and the B section of memory is made to memorize a revolver position again, respectively, as the flow chart of a view 4 shows here.

Next, a control circuit 10 sends a signal to the revolver drive circuit 6, and rotates the rotating type revolver 2 by one pitch, and an objective lens 20 is inserted in up to an observation optical path by it instead of an objective lens 19. Thus, the procedure same about the back objective lens 20 with which the objective lens which should be used was switched as the above performs focus detection. After focus detection is completed, stage position 20' at that time and a revolver position are read from the stage position detection sensor 8 and the revolver position detection sensor 5, and C portion and D portion of memory in a control circuit 10 are made to memorize them, respectively. A difference with stage position 19' before the objective lens change memorized by A portion-like at the time of the data of this C portion and former Norikazu is taken, and this difference is memorized by the data table 18 of a store circuit 12. For example, if mounting hole No.1 (it is only called REBO hole No.1 for short below) of a revolver 2 is equipped with an objective lens 19 and REBO hole No.2 are equipped with the objective lens 20, a portion of a data table 18 will memorize. Such work is done about all the objective lenses equipped by the revolver 2, and a data table 18 is made to memorize the difference of each focus position. What is necessary is to change the data of C portion to A portion, to change the data of D portion to B portion again, respectively at this time, and just to repeat above-mentioned operation, as a flow chart shows. Moreover, the difference of the focus position, i.e., a stage position, of **** trap ********** 19 and 21, for example, objective lenses, can be searched for by the arithmetic circuit 11 from the stage position difference between objective lenses 19 and 20, and the stage position difference between objective lenses 20 and 21. namely, the case of the example shown in a view 5 -- the stage position difference between the stage position difference between objective lenses 19 and 20, and objective lenses 20 and 21 -- **** -- it can ask by things In this way, when the number of the objective lenses with which the rotation revolver 2 should be equipped is set to N, (N2-N) / two data will be memorized by the data table 18.

Next, operation at the time of observation is described. In order to insert the objective lens 19 on an observation optical path and to switch this to an objective lens 20 now, the switch 16 of the control section 13 is pushed, or suppose that the revolver 2 was manually rotated in the direction of 3rd [ ** ] view arrow. In a control circuit 10,

stage position data 20' of point ********** 20 is temporarily memorized into A portion of the mem ory in a control circuit 10, and the revolver position at this time is memorized into B portion of memory. Next, based on the data which read the stage position difference between objective lenses 20 and 21, and were read, and the data memorized-like at the time of up Norikazu, give a signal from a data table 18 to the stage drive circuit 9, the sample move stage 7 is made to drive by that cause, and a new stage position is determined. The focus state which suited the switched new objective lens 21 in this way is acquired. In this case, the objective lens and frame of a microscope will need to make a stage 7 move to the right focus position of 20" again by change of an operating environment etc., if only the portion which the actual focus position showed for example, in the 5th view by d had shifted. In this case, focus detection is performed by pushing the AF switch 15 of the control section 13. in this way -- a focus -- detection -- carrying out -- having had -- back -- a control circuit -- ten -- inside -- memory -- A -- a portion -- temporary -- memorizing -- having had -- an objective lens -- 20 -- a stage -- a position -- 20 -- ' -- new -- setting up -- having had -- a stage -- a position -- 20 -- " -- between -- a difference -- asking -- having . A data table 18 rememorizes as correction value by which what made this difference the correction value till then already memorized by the data table 18 was updated. Since amendment of a stage position difference is performed on the occasion of the change of the o bjective lens with which back differs based on this new correction value, amendment of a focus position may be performed correctly.

Thus, since the data of a focus position are updated at the time of focus detection, it is not influenced by environmental change but always proper focus position amendment is attained. Moreover, since the amount of gaps will be 10 micrometers of numbers from severalmicro in practice even if the focus position has shifted at the time of the change of an objective lens, focus detection can be performed in an instant and a microscope with very sufficient operability may be offered.

[Effect of the Invention]

Since it is necessary not to input the data used for focus position amendment of the sample move stage when switching the objective lens with which the revolver was equipped with manual operation and in order to change an observation scale factor like **** according to this invention, and the above-mentioned data update at the time of focus detection, the microscope with very sufficient operability under which always proper focus position amendment may be performed according to the change of an objective lens also in prolonged use can provide.

CLAIMS

[Claim 1] The microscope equipped with two or more objective lenses which are characterized by providing the following and which can be switched, and the focus detection means. A storage means to memorize these ** data for every each set object lens. An amendment means to amend this ** gap with the objective lens currently used before the change, and the objective lens used after a change based on the data of the above-mentioned storage means, and to make a good image formation state hold. A means to update these ** data of each set object lens memorized by the above-mentioned storage means at the time of focus detection.

DRAWINGS

Fig. 1

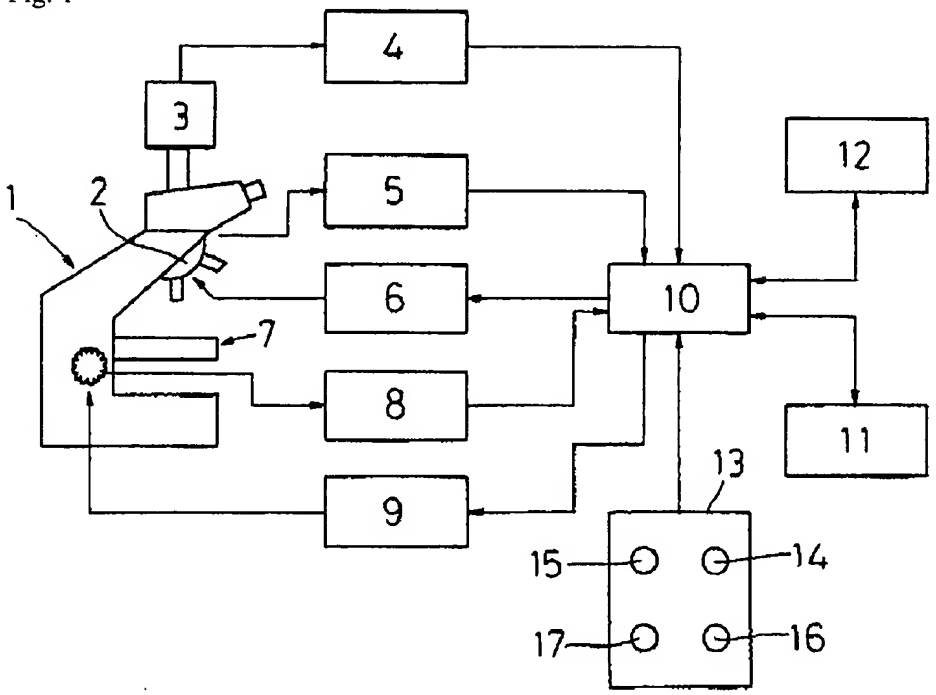



Fig. 2

| レボルバー穴 No. | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 |
|---|---|---|---|---|---|---|
| No. 1 | | (2) | 5 | 20 | 7 | 0 |
| 2 | | | 7 | 18 | 19 | 2 |
| 3 | | | | 25 | 2 | 5 |
| 4 | | | | | 27 | 20 |
| 5 | | | | | | 7 |
| 6 | | | | | | |

a

18

Fig. 3

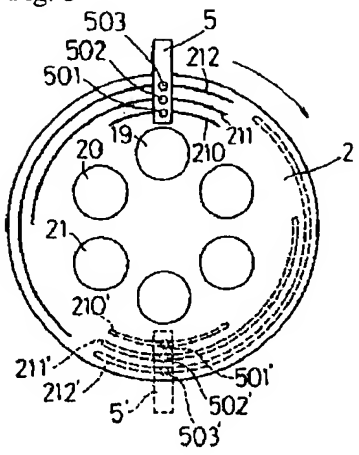
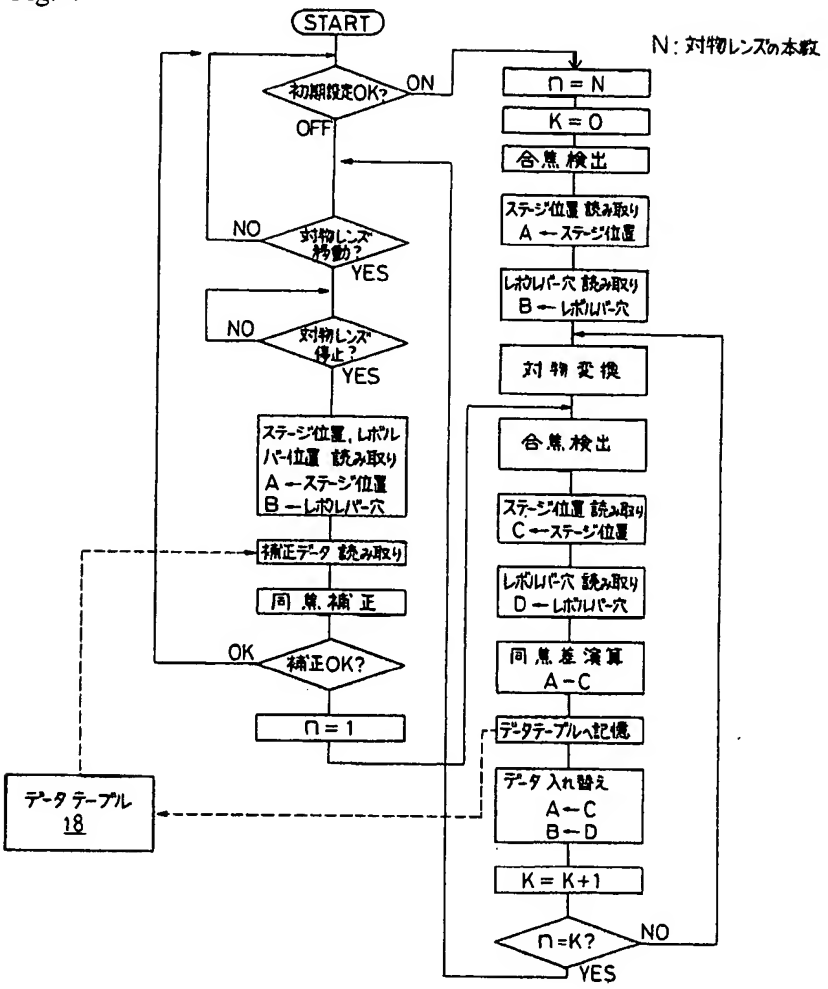

503
5
502
212
501
19
211
20
210
2
21
210'
211'
212'
5'
501'
502'
503'

Fig. 4


START
初期設定OK?
ON
OFF
N: 対物レンズの本数
n = N
K = 0
合焦検出
ステージ位置 読み取り
A ← ステージ位置
レボルバー穴 読み取り
B ← レボルバー穴
対物レンズ 移動?
NO
YES
対物レンズ 停止?
NO
YES
対物変換
ステージ位置, レボルバー位置 読み取り
A ← ステージ位置
B ← レボルバー穴
合焦検出
ステージ位置 読み取り
C ← ステージ位置
補正データ 読み取り
レボルバー穴 読み取り
D ← レボルバー穴
同焦補正
同焦差演算
A − C
OK
補正OK?
データテーブルへ記憶
n = 1
データ入れ替え
A ← C
B ← D
データテーブル
18
K = K+1
n = K?
NO
YES